THE Cane Growers' QUARTERLY BULLETIN

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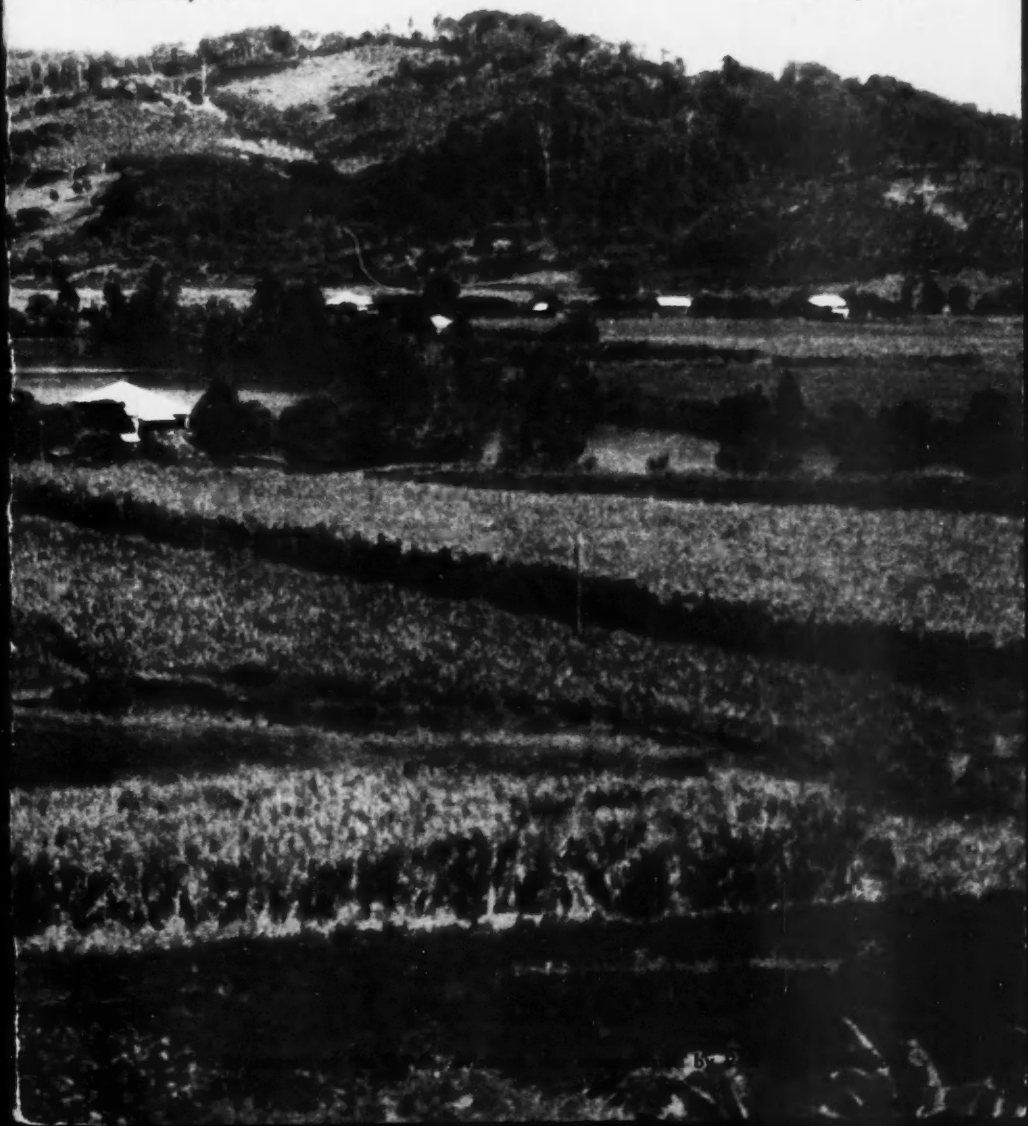

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BUREAU OF SUGAR EXPERIMENT STATIONS
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THE
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QUARTERLY BULLETIN

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This Bulletin is an official publication of the extension service of the Bureau of Sugar Experiment Stations, issued and forwarded by the Bureau to all cane growers in Queensland.

The Cane Growers' Quarterly Bulletin

VOL. XX. 1 APRIL, 1957 No. 4

Farm Fertilizer Trials
RESULTS OF THE 1956 SEASON

By L. G. VALLANCE

UREA—Cheaper Nitrogen

Production costs were again very much in mind when the fertilizer trials harvested during the 1956 season were set out. The possibility of urea providing a cheaper source of nitrogen than sulphate of ammonia prompted a series of experiments with this material in all the major cane growing districts. The object of these trials was twofold. In the first place, it was necessary to find out whether the nitrogen contained in urea was as acceptable to the cane plant as that of sulphate of ammonia. Secondly—and equally important from a practical point of view—it was essential to know whether urea would remain in a satisfactory physical condition under the wet and humid conditions that so often prevail in sugar districts.

This latter point was very easily determined by storage observations at the northern and southern Experiment Stations. The period of observation covered several months and included the rainy season. The urea used was in "prill" or "pellet" form, *i.e.*, during manufacture it had been processed into a coarse granular texture in contrast to the somewhat powdery mass of small crystals that is typical of a fertilizer such as sulphate of ammonia. It was found that this prilled urea kept excellently. It did not absorb moisture and become wet and sticky, nor did it become compact and difficult to break up. From this point of view there is no doubt that, for cane farming purposes, urea is as suitable as, and is possibly preferable to, the type of sulphate of ammonia that has been available to the sugar industry for some time past.

For the field trials, uniform blocks of plant and ratoon cane were selected in typical areas. In order to compare the two materials some portions of these blocks were top dressed with sulphate of ammonia, some with urea, while other portions were used as check plots and received no top dressing. Of course, all the plots received adequate amounts of phosphate and potash. Several trials were lost because of the weather, particularly the cyclonic blow in the northern areas early in 1956. However, seven trials were harvested and the results of these have given a very good comparison of the value of urea and sulphate of ammonia when applied to sugar cane under our prevailing climatic and cultural conditions.

These comparisons made it very clear that there were no differences between the two materials as far as crop response was concerned and that urea was as

effective as sulphate of ammonia for top dressing sugar cane. In the trials, regular determinations of the sugar content of the cane were made, but no differences were obtained between the two forms of nitrogen.

Under the circumstances, therefore, a grower should have no hesitation in using urea for top dressing providing he can procure it at a price which is favourable in comparison to that of

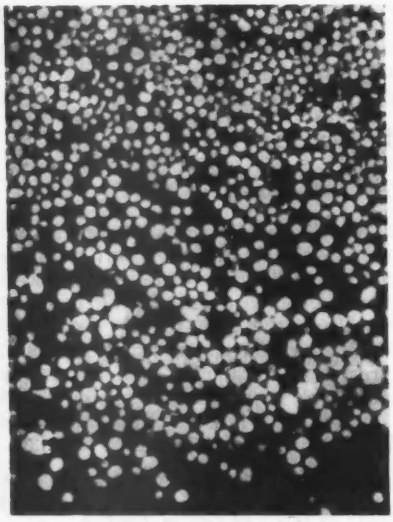


Fig. 66—The prilled form of urea—the latest nitrogen fertilizer. Note the granular nature of the material.

sulphate of ammonia. In this connection it should be realised that urea contains 46.0 per cent. nitrogen while sulphate of ammonia contains 20.6 per cent. In other words, 1 ton of urea is equivalent to 2 tons 4½ cwt., or nearly 2¼ tons of sulphate of ammonia. For field application a top dressing of 3 cwt. of sulphate of ammonia per acre could be replaced by one of 150 lb. of urea. Brisbane prices quoted at the present time are: Urea, £75/16/- per ton; Sulphate of ammonia, £39/5/-.

A little simple arithmetic reveals that the above prices are very much in favour of urea. For example, supposing a farmer had purchased 2¼ tons of sulphate of ammona; on Brisbane price this would cost him just over £88. He could have purchased the same amount of nitrogen by buying one ton of urea at approximately £76 (Brisbane)—a saving of about £12. An added advantage in favour of urea is due to the fact that it contains over twice as much nitrogen as sulphate of ammonia, and consequently there is less than half the bulk of material to be transported and handled.

At the present time the amount of urea imported and available in Queensland is very small indeed in relation to the thousands of tons of sulphate of ammonia used. It is therefore all the more surprising that the price should be so much in its favour. It seems a logical conclusion that bulk shipments of urea would drastically reduce the cost of sugar cane fertilizing, would halve the transport and handling of nitrogen, and would in no way decrease the productivity of the crop.

As is the case with sulphate of ammonia, urea is manufactured synthetically. Fundamentally it is a combination of ammonia and carbon dioxide, which are two very well known and common materials. Commercial urea is produced in huge quantities and is not derived from animal wastes although its formula is identical with the urea that forms part of the waste products of living animals. It is an odourless, white, crystalline solid. It dissolves very easily in water; and in moist air, unless specially treated, it will absorb moisture. For use as fertilizer urea is processed into a granulated condition (see fig. 66) and these granules remain in a loose, free-running state.

With the exception of ammonia gas itself, urea contains a considerably higher percentage of nitrogen than other nitrogen fertilizers. Because of this it is generally regarded as being one of the cheapest nitrogen-supplying chemicals to manufacture per unit of nitrogen.

Since many farmers will be interested in the details of the abovementioned trials they are summarised hereunder.

UREA *versus* SULPHATE OF AMMONIA TRIALS

In these trials it should be noted that 100 lb. of urea contains, for all practical purposes, the same amount of nitrogen as 2 cwt. of sulphate of ammonia. Similarly, 200 lb. of urea is equivalent to 4 cwt. of sulphate of ammonia.

Messrs. R. J. and F. I. WATTERS, Highleigh, via Gordonvale.

Soil type: Grey clay loam. **Nature of crop:** First ratoon.
Variety: Trojan. **Age of crop:** 12 months.
Harvested: End of August, 1956.

Top dressing per acre	Yield (tons per acre)	
	Cane	Sugar
No nitrogen	31.1	4.6
100 lb. urea	36.0	5.1
2 cwt. sulphate of ammonia	36.5	5.0
200 lb. urea	39.0	5.3
4 cwt. sulphate of ammonia	39.4	5.4

Remarks: This trial showed a highly significant response to the application of nitrogen both in terms of cane and sugar per acre. There were no differences, however, in the responses due to urea and sulphate of ammonia.

Mr. M. DREXL, Highleigh, Gordonvale.

Soil type: Red brown loam. **Nature of crop:** Plant cane.
Variety: Trojan. **Age of crop:** 17 months.
Harvested: Beginning of October, 1956.

Top dressing per acre	Yield (tons per acre)	
	Cane	Sugar
No nitrogen	47.6	7.4
100 lb. urea	49.1	7.3
2 cwt. sulphate of ammonia	48.5	7.3
200 lb. urea	49.1	7.2
4 cwt. sulphate of ammonia	47.5	7.2

Remarks: As is often the case with plant cane this trial did not show a very well defined response to nitrogen. The slight increases obtained were somewhat variable and there were no differences between the urea and sulphate of ammonia plots.

Messrs. W. G. WALL & CO., Up. River, Home Hill.

Soil type: Grey alluvial sandy loam. **Nature of crop:** Plant cane.
Variety: Trojan (irrigated). **Age of crop:** 14 months.
Harvested: End of August, 1956.

Top dressing per acre	Yield (tons per acre)	
	Cane	Sugar
No nitrogen	48.2	7.4
100 lb. urea	49.8	7.7
2 cwt. sulphate of ammonia	50.8	7.6
200 lb. urea	51.2	7.5
4 cwt. sulphate of ammonia	52.5	7.7

Remarks: The slightly heavier yields in the plots which had been top dressed were not sufficiently definite to be significant, particularly for the lighter applications. The responses due to the heavier amounts were more noticeable, but taking into consideration the variation that occurred from plot to plot it was not possible to see any real difference between urea and sulphate of ammonia.

Messrs. A. R. FORDYCE & SONS, Boldon, via Mackay.

Soil type: Grey sandy loam. **Nature of crop:** Plant cane.

Variety: Q.50. **Age of crop:** 14 months.

Harvested: Beginning of October, 1956.

Top dressing per acre	Yield (tons per acre)	
	Cane	Sugar
No nitrogen	24.3	3.9
100 lb. urea	28.8	4.7
2 cwt. sulphate of ammonia	28.2	4.7
200 lb. urea	31.0	5.1
4 cwt. sulphate of ammonia	32.3	5.5

Remarks: A very good response to nitrogen was obtained in this trial and the heavier dressings also produced definitely better growth than the lighter applications. However, urea and sulphate of ammonia gave equally beneficial results and it was not possible to measure any consistent differences between these two fertilizers.

CENTRAL SUGAR EXPERIMENT STATION, Mackay.

Soil type: Grey silt loam. **Nature of crop:** First ratoon.

Variety: Q.50. **Age of crop:** 12 months.

Harvested: End of October, 1956.

Top dressing per acre	Yield (tons per acre)	
	Cane	Sugar
No nitrogen	14.7	2.6
100 lb. urea	17.0	3.0
2 cwt. sulphate of ammonia	16.8	3.0
200 lb. urea	18.3	3.2
4 cwt. sulphate of ammonia	19.1	3.4

Remarks: This first ratoon crop of cane, although badly affected by very wet conditions, showed a highly significant response to nitrogen, but no differences were apparent between the responses due to urea or sulphate of ammonia. It was quite obvious throughout this trial that both of these fertilizers were providing the nitrogen requirements of the crop with equal efficiency.

Messrs. NEWMAN and ZISCHKE, Barolin Road, Bundaberg.

Soil type: Red basaltic loam. **Nature of crop:** First ratoon.

Variety: C.P.29/116. **Age of crop:** 12 months.

Harvested: End of October, 1956.

Top dressing per acre	Yield (tons per acre)	
	Cane	Sugar
No nitrogen	38.8	6.0
100 lb. urea	43.4	6.6
2 cwt. sulphate of ammonia	43.9	6.5
200 lb. urea	45.7	6.5
4 cwt. sulphate of ammonia	45.2	6.4

Remarks: A very marked response to nitrogen was obtained in this trial, but there were no real differences between urea and sulphate of ammonia.

Messrs. BLACK BROS., Bundaberg.

Soil type: Red forest loam. **Nature of crop:** Plant cane.

Variety: Vesta. **Age of crop:** 13 months.

Harvested: Early October, 1956.

Top dressing per acre	Yield (tons per acre)	
	Cane	Sugar
No nitrogen	26.3	4.3
100 lb. urea	30.4	5.1
2 cwt. sulphate of ammonia	30.4	5.1
200 lb. urea	31.1	5.2
4 cwt. sulphate of ammonia	32.3	5.3

Remarks: The application of nitrogen either as urea or sulphate of ammonia produced very beneficial results in this crop of plant cane. There were no differences between urea and sulphate of ammonia.

FERTILIZER MIXTURE TRIALS

Mr. F. DARVENIZA'S FARM, South Johnstone.

Soil type: Red volcanic. **Nature of crop:** Plant cane.

Variety: Badila. **Age of crop:** 14 months.

Harvested: Early August, 1956.

This trial is now in its second planting cycle. The detailed results of the first plant and two ratoon crops have already been published (Quarterly Bulletin, April, 1953, 1954, 1955). As pointed out previously, the trial was set out on

an area which had a history of heavy fertilizing and which in consequence was well supplied with phosphate and potash. Medium to heavy amounts of fertilizer were used in the experiment and the results to date have shown that the heavy amounts (which are by no means unusual in the Innisfail district) were not required. Their usage is wasteful and if persisted with could appreciably increase the cost of production.

The amounts of fertilizer used, and the yields produced by them, in this second plant crop are shown in the accompanying table.

SUMMARY OF CROP YIELDS

Fertilizer per acre	Yields tons of sugar per acre
1. 4 cwt. Sugar Bureau No. 2 (Planting) plus 2 cwt. sulphate of ammonia	5.8
2. 4 cwt. Sugar Bureau No. 2 (Planting) plus 4 cwt. sulphate of ammonia	5.7
3. 6 cwt. Sugar Bureau No. 2 (Planting) plus 2 cwt. sulphate of ammonia	5.8
4. 6 cwt. Sugar Bureau No. 2 (Planting) plus 4 cwt. sulphate of ammonia	5.6
5. 8 cwt. Sugar Bureau No. 2 (Planting) plus 2 cwt. sulphate of ammonia	5.8
6. 8 cwt. Sugar Bureau No. 2 (Planting) plus 4 cwt. sulphate of ammonia	5.6

It should be noted that once again the heavier amounts of fertilizer brought about no beneficial response. It is also of interest to note that the treatments receiving the heavier amounts of sulphate of ammonia as well as the mixture did not yield any better than those receiving the lighter applications. In fact, the c.c.s. figures showed a slight decrease on those plots which received the heavier top-dressings.

Messrs. CLAUSSEN & Co., Giru.

Soil type: Alluvial loam. **Nature of crop:** First ratoon.

Variety: Q.57. **Age of crop:** 10 months.

Harvested: Late August, 1956.

SUMMARY OF CROP YIELDS

Fertilizer	Rate per acre	Yield tons sugar per acre
Sulphate of ammonia	nil	3.6
	200 lb.	4.0
	400 lb.	4.3
Superphosphate	nil	4.1
	200 lb.	3.9
	400 lb.	3.9
Muriate of potash	nil	4.1
	150 lb.	4.0
	300 lb.	3.8

In this first ratoon crop there was a very definite increase in yield due to the application of sulphate of ammonia. The figures showed that the lighter dressing (200 lb. per acre) raised the yield of sugar per acre from 3.6 to 4.0 tons, while a further 200 lb. of sulphate of ammonia increased it to 4.3 tons per acre. However, although the heavier application of nitrogen increased the

amount of cane grown, it reduced the c.c.s. from 15.3 to 14.5.

As with the plant crop there was again no response to either phosphate or potash.

Mr. A. B. JOHNSTON'S FARM, Coolum Road, Yandina.

Soil type: Grey black peaty loam. **Nature of crop:** Plant cane.

Variety: Q.50. **Age of crop:** 13½ months.

Harvested: mid-November, 1956.

SUMMARY OF CROP YIELDS

Fertilizer	Rate per acre	Yield tons sugar per acre
Sulphate of ammonia	nil	5.0
	200 lb.	4.7
	400 lb.	4.9
Superphosphate	nil	4.8
	200 lb.	4.8
	400 lb.	4.6
Muriate of potash	nil	4.3
	150 lb.	4.5
	300 lb.	5.3

This trial was planted on one of the highly organic peaty types of soil which are typical of much of the Maroochy area. A good velvet bean crop was ploughed in prior to planting and quite evidently no sulphate of ammonia was required for the plant crop.

The application of potash, however, was very necessary and the yields were considerably improved by the addition of both levels of this fertilizer.

A rather interesting feature of this trial was the fact that, on the plots where phosphate was applied, the addition of potash *increased* c.c.s., but when no phosphate was used the addition of potash *decreased* the c.c.s. quite considerably. Apparently therefore it is advisable to apply both potash and phosphate to this soil.

A MINOR ELEMENT TRIAL

Mr. E. H. CHURCHWARD'S FARM, Gooburrum.

Soil type: Grey sandy loam. **Nature of crop:** Plant cane.

Variety: C.P.29/116. **Age of crop:** 17 months.

Harvested: Early September, 1956.

SUMMARY OF CROP YIELDS

Treatment	Yield tons cane per acre
No copper sulphate	36
60 lb. copper sulphate per acre	36
80 lb. copper sulphate per acre	37

On this area a preliminary observational trial the previous year with minor elements had indicated the possibility of a slight response in cane growth to copper applied as copper sulphate. This was not very definite but it was

considered worth while to set out a quantitative trial to investigate the matter more closely. However, when the cane from the second trial was weighed there were no differences between the plots which received copper and those which did not. The figures in the table show this clearly enough. The slightly heavier yield of the 80 lb. copper dressing is due to soil variation and not to the effect of the copper application.

Some spectacular responses due to copper have been obtained in the Bundaberg district, but the above soil is capable of growing very good crops of cane without the addition of this minor element.

Acknowledgments.

The Bureau is grateful to all the above growers who so kindly made land and assistance available for the carrying out of these trials. The co-operation of the following fertilizer companies, who generously donated most of the fertilizer for these trials, is also appreciated:—Messrs. A.C.F. & Shirleys Fertilizers Ltd.; Messrs. Fertiliser Distributers Pty. Ltd.; and Messrs. Henry H. York & Co. Pty. Ltd.

Aerial Spraying of Weedicides

A further advance in sugar cane agriculture has been achieved in the Home Hill and Giru areas with the successful aerial spraying of hormone weedicides on cane fields. At the end of 1956 and early in 1957, some cane growers noted a heavy growth of convolvulus vines in cane crops which were too far advanced in growth to permit inter-row cultivation. Destruction of the vines by hand would have been impractical, and an aerial spraying company was called in for a demonstration of its work. Results were so successful that the method may now be adopted in the districts where the trials were carried out.

While many broad leaf weeds cause little damage to advanced cane crops, vines may injure the crop by binding together the younger leaves, resulting in distorted growth of affected stalks, while in some cases vines may develop a blanket growth on top of the cane causing a partial smothering. The effects at harvest time are of particular importance, when hand cutting may be slowed down as a result of the tangling vine growth. Other broad leaf weeds such as sida retusa and noogoora burr, although causing little damage in a well grown cane crop, were effectively controlled by aerial spraying.

The spraying was carried out by an aircraft flying just above the tops of the cane leaves, and in some of the areas treated conditions were by no means ideal, obstacles such as power and telephone lines, trees and buildings, required skilful manoeuvring by the pilot. To ensure that the weedicide was applied in the correct spot, spraying was carried out in the early morning when still air conditions prevented drift of the spray.

Finally, with new methods, costs play an important part, and while obviously the figure must vary depending on the extent of the area to be treated and its distance from the landing strip, the recent applications in the Burdekin and Giru areas averaged between £2/10/- and £3 per acre, which included the cost of 2½ lbs. per acre of hormone weedicide. From the results obtained we may find an increase in the area sprayed in future years.

—G.A.C.

Varietal Trials—1956 Season

By G. C. BIESKE

At the beginning of 1956, weather conditions were, in general, ideal for cane growth, and above average cane production was anticipated. A cyclone in March, however, caused extensive damage from Mackay northward, and considerably lessened earlier expectations. Pindar was the most badly affected cane, in some cases suffering 100 per cent. decapitation. The opportunity was taken to assess the behaviour of the present seedlings in the areas subjected to the intense winds, such information being valuable since cyclones are not a rare occurrence in the northern sugar belt, and there is a very real danger, as was the case this season, in the widespread planting of a variety highly susceptible to wind damage.

In the Mackay area, wet weather delayed harvesting operations, and unfortunately several trials remained unharvested at the close of the season.

The southern districts experienced a very good season and on the whole field trials produced excellent tonnages. Increased cloud incidence early in the year resulted in fairly general arrowing throughout the area.

Since the ultimate assessment of a variety rests on the economic net return, it was felt desirable to incorporate, in the trial summaries, the financial return from each variety. It should be noted that the return, in this case, refers only to the gross value less cutting costs and does not take into account costs incurred from planting, cultivation, fertilizing, grub control, etc., which are common to all varieties in a trial. Sugar values were calculated from the 1955 season award while award cutting rates for 1955 and 1956 were applied in accordance with the time of harvest.

PORTA AND SON, Mossman.

Soil type: Grey clay loam. **Nature of crop:** Plant.

Age of crop: 13 months. **Harvested:** July, 1956.

SUMMARY OF CROP YIELDS

Variety	Cane per acre	c.c.s. in cane	Sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	£ s. d.
Q.57	27.09	15.57	4.22	103 7 7
Q.64	27.74	15.22	4.22	102 13 2
Q.44	28.91	14.12	4.09	94 15 4
Mowbray Sdg.	23.20	14.24	3.29	76 18 9
J.225	22.56	13.95	3.14	73 1 8

DISCUSSION.

Soil tilth was fair and soil moisture was good when this trial was planted in June, 1955. With the exception of Q.57, even strikes were obtained, although the rate of germination varied from very fast with Q.64 to very slow with Mowbray Seedling. Unsuitable planting material for the Q.57 plots necessitated considerable supplying with this variety. A dry spell in December and a cyclone in March, which was followed by unfavourable growing conditions, checked growth in all varieties and this is reflected in the final harvest results. At the time of harvest, J.225 was arrowing moderately while light arrowing was observed in the Q.44 plots.

The three varieties, Q.44, Q.64 and Q.57 have produced the highest cane

tonnages. However, the superior c.c.s. figures for Q.57 and Q.64 resulted in these two varieties leading in sugar production and giving the best net return.

NORTHERN SUGAR EXPERIMENT STATION, Gordonvale, Block A.3.

Soil type: Brown to grey clay loam. **Nature of crop:** First ratoon.
Age of crop: 13 months. **Harvested:** August, 1956.

SUMMARY OF CROP YIELDS

Variety	Plant Crop		First Ratoon Crop		Summary		
	Cane per acre	c.c.s. in cane	Cane per acre	c.c.s. in cane	Total cane per acre	Total sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	per cent.	tons	tons	£ s. d.
Pindar	39.05	13.86	27.81	15.28	66.86	9.66	230 8 9
K.690	36.82	13.36	33.47	14.19	70.29	9.68	223 3 1
K.675	34.67	13.32	29.85	15.01	64.52	9.08	213 2 3
K.728	30.04	14.68	27.42	15.75	57.46	8.73	214 7 3
K.646	31.94	13.05	28.50	14.04	60.44	8.17	186 9 8

DISCUSSION.

This trial ratooned well and all varieties maintained good growth until a cyclone in March, 1956, caused almost 100 per cent. decapitation of the Pindar. Wind damage to the K. seedlings was only slight so that the ratoon harvest results present an unfair comparison between these varieties and the standard Pindar when assessing crop yields. K.690 has produced the most cane and sugar per acre but was closely followed by K.675 and K.728, both of which possessed better juice quality.

In the aggregate of the two crops, Pindar and K.690 produced equivalent amounts of sugar, but the superior c.c.s. figures for Pindar have given a higher net return for this variety. K.728, although lacking the vigour of the leaders, impressed by having the best early sugar and the highest c.c.s. figures at both harvests.

C. JOHNSON, Highleigh.

Soil type: Grey-brown schist. **Nature of crop:** First ratoon.
Age of crop: 11 months. **Harvested:** June, 1956.

SUMMARY OF CROP YIELDS

Variety	Plant Crop		First Ratoon Crop		Summary		
	Cane per acre	c.c.s. in cane	Cane per acre	c.c.s. in cane	Total cane per acre	Total sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	per cent.	tons	tons	£ s. d.
Thick Badila	44.55	13.12	36.96	12.38	81.51	10.41	228 8 5
Ayr Badila	41.24	13.59	35.86	13.24	77.10	10.36	235 8 3
Innisfail Badila	40.77	13.86	35.19	14.24	75.96	10.65	249 8 1
Badila Seedling	40.72	13.67	33.26	13.28	73.98	10.00	227 10 7
Oba Badila	39.59	13.63	34.82	13.18	74.41	9.98	227 5 0

DISCUSSION.

Excellent ratooning followed the grubbing of this trial and all Badila types made satisfactory early growth. As was the case in the plant crop, Badila Seedling and Oba Badila exhibited the tendency towards lodging and early arrowing. The other types remained erect and did not arrow.

The ratoon harvest results paralleled those obtained in the plant crop, Thick Badila leading by a small margin in cane per acre, and Innisfail Badila, by virtue of its better juice quality, showing to a slight advantage in sugar production. In the aggregate of the two crops Thick Badila has produced the highest cane tonnage while in sugar per acre, Innisfail Badila has maintained a slight lead. However, it is by no means certain that similar results could always be achieved. An over-all consideration of the relative merits of the various Badila types places Badila Seedling and Oba Badila at a disadvantage as a result of their tendency to lodge and arrow early.

LOWER BURDEKIN SUGAR EXPERIMENT STATION, Ayr, Block B.1.

Soil type: Alluvial loam. **Nature of crop:** First ratoon.

Age of crop: 12 months. **Harvested:** October, 1955.

SUMMARY OF CROP YIELDS

Variety	Plant Crop		First Ratoon Crop		Summary				
	Cane per acre	c.c.s. in cane	Cane per acre	c.c.s. in cane	Total cane per acre	Total sugar per acre	Gross return per acre less harvesting costs		
	tons	per cent.	tons	per cent.	tons	tons	£	s.	d.
Pindar	50.87	17.02	39.42	17.65	90.29	15.62	409	6	5
L.473	56.35	15.20	36.48	16.44	92.83	14.56	364	5	0
L.470	52.68	15.70	31.84	17.12	84.52	13.70	349	2	9
L.469	46.14	16.84	28.07	17.24	74.21	12.61	328	12	4
L.409	48.82	15.73	33.68	17.38	82.50	13.53	346	17	5
S.J.16	45.41	15.62	27.36	17.04	72.77	11.75	298	6	1

DISCUSSION.

Ratooning in all varieties was satisfactory and resulted in good stands in all plots. Of the L. seedlings, L.469 impressed with its erect habit of growth when the other varieties tended to lodge. At harvest time, Pindar had the highest c.c.s. and outyielded the remainder of the trial in both cane and sugar per acre. L.473 performed reasonably well in cane production, but once again possessed the lowest juice quality.

In the aggregate of the two crops, L.473 produced a higher cane tonnage than Pindar, but the higher c.c.s. figures for Pindar enabled this variety to lead in sugar production. The other L. seedlings performed better than S.J.16, but did not measure up to Pindar, the other standard in the trial. L.469, although lacking in vigour, may prove a useful variety on account of its comparatively high early sugar and resistance to lodging.

LOWER BURDEKIN SUGAR EXPERIMENT STATION, Ayr, Block C.1.

Soil type: Sandy loam. **Nature of crop:** Plant.

Age of crop: 15 months. **Harvested:** October, 1956.

SUMMARY OF CROP YIELDS

Variety	Cane per acre	c.c.s. in cane	Sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	£ s. d.
Trojan	49.18	17.68	8.70	229 5 4
M.421	44.39	17.89	7.93	210 7 0
M.456	37.55	17.50	6.57	172 3 2
M.415	37.14	17.36	6.43	168 2 9
M.441	40.15	16.04	6.42	161 14 1
Pindar	32.24	17.86	5.76	152 3 1

DISCUSSION.

Satisfactory germination occurred following the planting of this trial and no supplying was necessary. All varieties made good growth until a cyclone in March, 1956, caused extensive decapitation of Pindar so that an evaluation of the M. seedlings should only be made in relation to the other standard variety, Trojan. Apart from Trojan, M.421 impressed in regard to vigour and stooling. Maturity testing carried out in June, 1956, showed that M.456 and Pindar were several units of c.c.s. higher than the other varieties. Both M.456 and M.441 arrowed in June.

Apart from M.441, there was little difference in juice quality between the various canes at time of harvest so that Trojan, leading in cane tonnage, established a clear lead in sugar production. An earlier harvest may have improved the relative performance of M.421.

LOWER BURDEKIN SUGAR EXPERIMENT STATION, Ayr, Block E.

Soil type: Alluvial sandy loam. **Nature of crop:** First ratoon.

Age of crop: 12 months. **Harvested:** October, 1956.

SUMMARY OF CROP YIELDS

Variety	Plant Crop		First Ratoon Crop		Summary		
	Cane per acre	c.c.s. in cane	Cane per acre	c.c.s. in cane	Total cane per acre	Total sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	per cent.	tons	tons	£ s. d.
Pindar	35.92	18.06	30.71	18.20	66.63	12.06	323 7 7
L.423	28.28	18.02	33.32	19.42	61.60	11.57	313 16 1
P.O.J. 3016	33.88	17.99	36.63	19.12	70.51	13.10	354 4 7
P.O.J. 2961	29.40	17.68	36.53	17.94	65.93	11.73	312 10 4
S.J.16	22.01	17.26	26.48	18.61	48.49	8.76	232 12 11
L.469	25.68	17.04	31.32	18.58	57.00	10.21	271 11 8

DISCUSSION.

This trial was planted in June, 1954, and good germinations were recorded for all varieties. Some soil irregularity and adverse growing conditions caused erratic growth and at harvest time plot yields were very variable. Although Pindar produced the best harvest results, the plot variability rendered these results inconclusive.

All varieties ratooned strongly, S.J.16

being the slowest to come away. Cyclonic winds in March, 1956, resulted in extensive top breakage in the Pindar plots and coupled with existing plot variability, the ratoon harvest figures are of doubtful value. Under these conditions, therefore, it would be unwise to make conclusions on the relative performances of these varieties over the two crop cycles.

F. C. RAYBINE, Hummock Road, Bundaberg.

Soil type: Red volcanic loam. **Nature of crop:** Plant.
Age of crop: 14½ months. **Harvested:** November, 1956.

SUMMARY OF CROP YIELDS

Variety	Cane per acre	c.c.s. in cane	Sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	£ s. d.
L.76	54.74	17.28	9.46	248 2 8
Q.50	50.13	17.10	8.58	223 7 9
L.77	44.80	18.20	8.14	218 11 5
L.63	46.46	16.95	7.88	204 7 1
Q.47	43.36	16.80	7.29	188 4 6
L.79	41.06	17.28	7.08	186 2 7
L.9	34.94	17.75	6.20	164 8 7
L.40	34.36	17.00	5.84	151 15 11

DISCUSSION.

Low soil moisture at the time of planting this trial retarded germination rates, but ultimate germinations exceeded 90 per cent. for all varieties. Early growth favoured Q.50, L.76, L.77 and Q.47, while L.40 was rather backward. In May, 1956, L.40 had commenced to arrow and by August, Q.47 was arrowing, while occasional flagging was observed in L.76, L.77 and L.79. Maturity testing carried out in July indicated that all the L. seedlings with the exception of L.76 had better juice quality than the two standard varieties, Q.50 and Q.47.

L.76 and Q.50 yielded appreciably heavier crops than the other varieties and in sugar production established a definite lead. L.77 had the highest early sugar and at harvest time returned the best c.c.s. Both L.77 and L.63 performed slightly better than Q.47, the other standard variety.

SOUTHERN SUGAR EXPERIMENT STATION, Bundaberg, Block E.3b.

Soil type: Red volcanic loam. **Nature of crop:** Plant.
Age of crop: 13 months. **Harvested:** October, 1956.

SUMMARY OF CROP YIELDS

Variety	Cane per acre	c.c.s. in cane	Sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	£ s. d.
Q.50	44.53	17.09	7.60	198 8 7
Q.47	41.38	16.42	6.80	173 5 2
C.P.29/116	40.72	15.11	6.15	150 3 0
Q.49	38.97	15.40	6.00	148 3 11
Co.281	34.72	16.82	5.84	150 14 3
Co.290	40.28	14.35	5.79	136 18 4
P.O.J.2725	36.62	15.09	5.52	135 0 8
Q.813	33.84	16.22	5.49	139 1 11
M.189	30.40	14.80	4.50	108 11 10

DISCUSSION.

Since susceptibility to ratoon stunting disease may have resulted in many of the older commercial varieties being discarded, this trial was set out in order to compare the performances of some past and present varieties when ratoon stunting disease is absent. All varieties struck quickly, the percentage germination in all plots exceeding 95 per cent. With the exception of M.189, stooling and vigour were excellent in the early stages with Co.290, Q.50, Q.47 and Q.49 showing to advantage. M.189 was the least vigorous and at all times was unimpressive. In July, 1956, C.P.29/116 and P.O.J.2725 were arrowing heavily, while fairly general flagging was occurring in Q.47 and Q.49.

The modern varieties have, in general, overshadowed the older ones in both cane and sugar production. Q.50, with the highest c.c.s. figures, has been the outstanding variety and was superior to all other varieties when assessing sugar per acre. Co.290 equalled Q.47, C.P.29/116 and Q.49 in cane production, but this was offset by a low c.c.s. Co.281 with a reasonably good juice quality has competed quite favourably with C.P.29/116 and Q.49.

SOUTHERN SUGAR EXPERIMENT STATION, Bundaberg, Block B.4.

Soil type: Red volcanic loam. **Nature of crop:** Plant.

Age of crop: 17½ months. **Harvested:** August, 1956.

SUMMARY OF CROP YIELDS

Variety	Cane per acre	c.c.s. in cane	Sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	£ s. d.
N.Co.310	43.33	16.22	7.02	178 1 11
Vesta	42.63	14.81	6.29	152 5 6
C.P.29/116	45.24	13.79	6.20	144 4 2
Q.50	40.72	15.01	6.11	148 11 8
Q.47	36.48	14.19	5.16	121 17 10
P.O.J.2878	31.12	14.93	4.64	112 19 2
M.1900S.	31.32	13.68	4.26	98 12 8

DISCUSSION.

This autumn plant crop was established with r.s.d.-free stocks of some of the older canes—P.O.J.2878 and M.1900 Seedling—and some of the present commercial varieties in order to ascertain the relative performances of past and present varieties. Dry conditions towards the end of 1955 retarded growth, the modern varieties exhibiting least distress. By May, 1956, M.1900 Seedling was lodging while the remainder of the varieties were commencing to flag. At the time of harvest, arrowing was profuse in N.Co.310 and C.P.29/116, moderate in Q.47, P.O.J.2878 and M.1900 Seedling, and light in Vesta and Q.50.

An analysis of the harvest results indicated the superiority of the present day varieties, both P.O.J.2878 and M.1900 Seedling producing the least cane and sugar per acre. C.P.29/116 has yielded the highest cane tonnage, but the superior juice quality of N.Co.310 has enabled this latter variety to gain a comfortable lead over all other varieties in sugar production.

VARIETAL TRIALS—*Continued on Page* 127.

Fig. 67—Cross pollination work at Meringa; the extensive polycross in 1956

Fig. 68—Babinda Sub-station. 2 sett plantings, 1956.

Fig. 69—Sawmill Pocket from Islay Hills. Ferrando's farm in foreground, February, 1956.

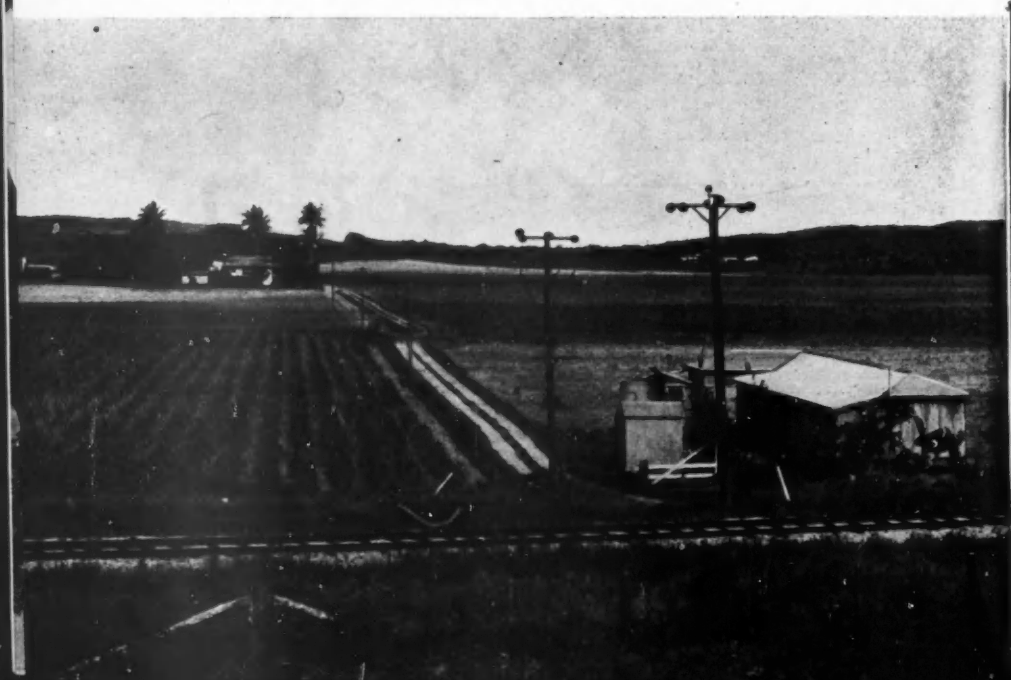
Fig. 70—Gordonvale from Islay Hills. Cucuruto's farm in centre, February, 1956.

Fig. 71—Baled bagasse from Victorias Mill stored ready for fuel purposes at Manapla Power Alcohol Factory.

Fig. 72—Main building of the new Sugar Research Institute at Lucknow.

Fig. 73—Q.57 on a rich river flat at "Drumsara." Mossman, 1956.

Fig. 74—Sundown area of Innisfail from Doherty's Hill.



VARIETAL TRIALS—*Continued from Page* 122.

C. B. COURTICE, Hummock Road, Bundaberg.

Soil type: Red volcanic loam. **Nature of crop:** First ratoon.
Age of crop: 12½ months. **Harvested:** November, 1956.

SUMMARY OF CROP YIELDS

Variety	Plant Crop		First Ratoon Crop		Summary		
	Cane per acre	c.c.s. in cane	Cane per acre	c.c.s. in cane	Total cane per acre	Total sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	per cent.	tons	tons	£ s. d.
I.70	37.63	15.54	39.56	17.38	77.19	12.73	328 6 7
Q.50	35.72	15.46	37.18	16.04	72.90	11.49	289 14 0
Q.61	32.18	15.74	34.90	16.68	67.08	10.88	278 13 3
Q.62	32.18	15.11	38.71	16.72	70.89	11.34	287 0 3
C.P. 29/116	33.55	14.38	39.93	15.00	73.48	10.81	262 5 5
H.25	32.50	14.72	38.40	15.68	70.90	10.80	267 2 5
I.53	32.50	14.40	34.53	14.32	67.03	9.63	229 12 5
H.45	29.22	15.32	37.28	16.48	66.50	10.62	269 3 6

DISCUSSION.

This trial was ratooned in November, 1955, and Q.50 and I.70 were the slowest to come away. These two varieties made slow early growth, but by June had overtaken the leaders, C.P.29/116, H.45 and Q.61. Conditions were favourable right through to harvest time when H.25, I.53, H.45, Q.50 and C.P.29/116 were in a sprawled state. Some severe red rot infection was observed in I.70 at this time.

An analysis of the ratoon harvest results indicated that, with the exception of Q.61 and I.53, the remainder of the varieties yielded comparable cane tonnages. In terms of sugar per acre, I.70, with excellent c.c.s. figures, demonstrated its superiority over all varieties except Q.62 and H.45. In the aggregate of the two crops, I.70 produced 12.73 tons of sugar, a good performance for this district. The susceptibility of I.70 to red rot infection is a decided disadvantage when considering the commercial possibilities of this variety.

W. J. CLAYTON AND COMPANY, North Isis.

Soil type: Red volcanic loam. **Nature of crop:** First ratoon.
Age of crop: 9½ months. **Harvested:** August, 1956.

SUMMARY OF CROP YIELDS

Variety	Plant Crop		First Ratoon Crop		Summary		
	Cane per acre	c.c.s. in cane	Cane per acre	c.c.s. in cane	Total cane per acre	Total sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	per cent.	tons	tons	£ s. d.
H.25	37.77	15.90	40.16	11.65	77.93	10.66	247 16 9
Castor	35.58	16.04	40.50	14.18	76.08	11.45	281 10 4
C.P. 29/116	37.18	15.05	41.29	12.45	78.47	10.72	248 13 4
H.19	34.06	15.75	40.62	14.90	74.68	11.42	282 13 6
Q.61	32.14	15.45	36.92	13.78	69.06	10.03	242 6 9
H.20	31.68	15.48	35.32	14.35	67.00	9.97	243 10 7
H.45	29.89	15.42	40.96	14.82	70.85	10.69	261 13 2

DISCUSSION.

This trial was ratooned in November, 1955, and ratooning was good in all varieties with the exception of H.25, which was slow and erratic. Q.61, Castor and H.25 exhibited most vigour in the early growth stages. This crop cycle was harvested at the age of 9½ months, but despite the early harvest excellent cane tonnages were obtained. Possession of good early sugar has resulted in H.45, Castor and H.19 leading by a comfortable margin in sugar production. H.25, with the lowest c.c.s. figures, reversed its plant crop performance by producing the least sugar per acre in the ratoon crop.

In the aggregate of the two crops there was little to choose between H.25, Castor, C.P.29/116 and H.19 in yield of cane, but the higher sugar content of Castor and H.19 resulted in these two varieties giving the best profitable return. After its poor performance in the plant crop, H.45 did remarkably well in the ratoon crop, and over-all gave the third highest net return.

SEE BROS., No. 2 Farm, North Isis.

Soil type: Red loam.

Nature of crop: Plant.

Age of crop: 14 months.

Harvested: November, 1956.

SUMMARY OF CROP YIELDS

Variety	Cane per acre	c.c.s. in cane	Sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	£ s. d.
Q.50	46.35	17.50	8.12	213 13 3
Q.62	45.92	17.40	7.98	209 18 4
I.70	46.24	17.16	7.94	206 18 8
Q.61	43.13	17.05	7.34	191 7 4
J.34	40.22	17.52	7.05	185 8 2
C.P.29/116	39.90	17.18	6.85	179 6 8
H.46	38.59	17.08	6.60	171 19 3

DISCUSSION.

Germination of the various canes ranged from 88 to 98 per cent. The varieties Q.50, Q.61, Q.62 and I.70 established an early lead, which was then maintained through to harvest. H.46 exhibited considerable vigour, but poor stooling was a bad feature in this variety. In September, C.P.29/116 was arrowing heavily, while light arrowing was occurring in H.46, I.70 and Q.61. At the time of harvest, extensive side-shooting was observed in C.P.29/116, while H.46 was displaying moderate numbers of side-shoots.

At the time of harvest, all varieties had very good sugar contents, with Q.50 yielding the highest cane and sugar tonnages. However, in view of a certain amount of plot variability, Q.50's performance could only be considered superior to that of C.P.29/116 and H.46.

H. P. TREVOR, Maroochy River, Moreton.

Soil type: Black clay loam.

Nature of crop: Plant.

Age of crop: 14 months.

Harvested: October, 1956.

SUMMARY OF CROP YIELDS

Variety	Cane per acre	c.c.s. in cane	Sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	£ s. d.
Pindar	26.44	15.25	4.03	99 0 4
M.M.20	26.62	14.40	3.83	90 19 11
M.M.19	25.56	14.20	3.63	85 8 3
M.M.36	25.00	14.40	3.60	85 9 2
J.28	22.75	15.60	3.55	88 5 3
J.64	14.56	16.30	2.37	60 3 10

DISCUSSION.

This trial was planted in August, 1955, and germinations ranging from 75 to 91 per cent. were recorded. After supplying, even stands developed in all varieties except J.64, which was very gappy. In the early stages dry conditions retarded growth and the trial made little progress. Early in 1956 the trial site was waterlogged for several months so that in general, adverse conditions were experienced throughout the crop cycle. Chlorotic streak disease was detected in M.M.19 in April, 1956.

With the exception of J.64, the remainder of the varieties yielded comparably and the statistical analysis indicated that no one variety could be considered superior.

W. J. RAMM, Maroochy River, Moreton.

Soil type: Alluvial silty clay loam.
Age of crop: 10 months.
Nature of crop: First ratoon.
Harvested: August, 1956.

SUMMARY OF CROP YIELDS

Variety	Plant crop		First Ratoon Crop		Summary		
	Cane per acre	c.c.s. in cane	Cane per acre	c.c.s. in cane	Total cane per acre	Total sugar per acre	Gross return per acre less harvesting costs
	tons	per cent.	tons	per cent.	tons	tons	£ s. d.
Q.62	29.50	15.64	30.00	14.20	59.50	8.87	216 18 4
I.70	26.69	15.30	21.75	14.85	48.44	7.31	180 1 7
Pindar	25.06	15.42	24.38	14.60	49.44	7.42	181 18 5
Q.61	25.00	13.86	24.56	13.68	49.56	6.82	158 18 6
I.53	22.88	14.24	20.75	13.78	43.63	6.12	144 6 7
H.45	22.25	14.19	20.31	14.92	42.56	6.19	148 18 7

DISCUSSION.

In ratooning ability, Q.62 was the leader, being closely followed by Q.61, Pindar and I.70. H.45 and I.53 were very slow and, as in the plant crop, exhibited least vigour. I.70 made slow early growth and the earliness of the harvest has undoubtedly contributed to the lower tonnage for this variety. Q.62 was outstanding at all stages and was impressive in regard to crop cover and stooling.

At the time of the ratoon harvest, Q.62 produced the highest cane and sugar yields and was superior to all other varieties except Pindar and Q.61. Over the two crops Q.62 was an easy winner and showed a profitable gain over the standard Pindar. I.70, Pindar and Q.61 performed equally well in regard to total cane production, but the lower sugar content of Q.61 has placed this variety at a decided disadvantage when assessing sugar production.

New Guinea Once More in the News

By C. G. HUGHES

From time to time over the past sixty years or so the island of New Guinea, the biggest land mass in the world after the continents and Greenland, has reached the headlines in the sugar press of the world. The reason is usually that another cane-collecting expedition is either preparing to go to or just returning from that country. In the present instance, it is because another scientific expedition is actually, at time of writing, busy collecting canes in New Guinea and neighbouring islands and sending them back to Queensland for quarantine propagation. The scientists are Dr. John N. Warner of the Experiment Station of the Hawaiian Sugar Planters' Association, and Mr. Carl O. Grassl of the United States Department of Agriculture. Finance has been arranged through the United States Plant Introduction Service, but the canes collected will eventually be freely available to all sugar producing countries.

It may be recalled that the chain of islands stretching south and east from southern Asia out into the Pacific Ocean have long been regarded as the focus of origin of *Saccharum*, the genus of large grasses which has given us all our commercial sugar canes. The species does occur naturally on the Asian mainland, and across northern Africa (but not at all in the Americas and Australia) but, even so, the variety and abundance of both wild and cultivated canes in the island group mentioned leaves no doubt that the origin and evolution of *Saccharum* has been concentrated there down through the countless centuries of species development.

Although the recorded expeditions

Fig. 75—Dr. John Warner (on right) examining cane in New Guinea during the 1951 Bureau Expedition.

date from 1892, and since then at least six have gone collecting in or around New Guinea, the region has not been closely covered, and many large areas still remain absolutely unknown to sugar-cane workers. Expeditions have generally been confined to known localities since living plant specimens cannot usually be brought out of unexplored territory; so it was not until 1951 when the Buzacott-Hughes expedition was organized by this Bureau, that the central highlands were examined for canes. The northern part of the Territory of New Guinea was not visited on that occasion and a vast area of possible sugar-cane country there still remains unknown. The new expedition hopes to fill in the blanks with regard to sugar cane in the highlands and the great northern river-sheds of the Sepik and Ramu. It is also hoped to collect in Dutch New Guinea, and in the islands north and west from there. It is an exciting prospect and cane-breeders are keenly awaiting what the next few months might bring forth out of the tropic jungles of the coastal areas and the cooler forests of the uplands.

Serious diseases and pests of sugar cane are known to occur in the New Guinea region and special precautions must be taken to ensure that none of them are transmitted through the planting material to commercial cane producing areas. The precautions taken for the 1951 expedition were successful and the same plan, but with a change in venue, is to be followed in the present instance. Where possible two setts, each from a different stalk, will be cut from an apparently disease-free stool and then packed with D.D.T. dust in a plastic wrapping for despatch by air to Cairns in North Queensland. The Bureau pathologist stationed there will plant them in a plot on a pineapple farm at Horseshoe Bay on Magnetic Island, some seven miles from Townsville.

There is no commercial cane on the island and the nearest on the mainland is over 20 miles away as the crow flies. The growing cane will be inspected at frequent intervals and any diseased or suspect stools immediately destroyed. The crop will also be frequently sprayed with insecticides to prevent the establishment, on the aerial parts, of any insects which might possibly act as vectors of disease. Canes will be grown to maturity and the subsequent planting will likewise be kept under the most careful supervision.

Dr. John N. Warner, the organizer and leader of the expedition, is not a stranger to Queensland. He visited our industry in the early part of 1951 and then accompanied Messrs. Buzacott and Hughes on their collecting expedition that same year. He is Senior Geneticist with the Experiment Station in Hawaii and was very active in seeking a site for the world collection of sugar-cane germ plasm now being established in India. He is well known to sugar-cane breeders through his own work under Dr. A. J. Mangelsdorf in Hawaii, as Chairman of the Standing Committee on Germplasm and Breeding of the International Society of Sugar Cane Technologists, and also as founder and editor of the Sugar Cane Breeders Newsletter, a valuable forum for the exchange of news and views in the cane-breeding world. Mr. Carl O. Grassl is in charge of the cane-breeding work at the United States Department of Agriculture Station at Canal Point on the shores of Lake Okeechobee, Florida. There he raises cane seed for distribution to the sugar cane growing areas of Louisiana and to the syrup producing areas of Mississippi; he also grows seedlings for local selection. His interests have been chiefly centred in the taxonomic aspects of cane-breeding and he has got together an excellent collection of grasses for use in his work. His botanical knowledge should be particularly valuable in New Guinea. His call here on his way to New Guinea was Mr. Grassl's first visit to Queensland, but he has often acted as host in the States for visiting Queensland officers.

Drainage on the Bundaberg Experiment Station

The Bundaberg Sugar Experiment Station has, within its confines, a basin shaped area into which drains the excess run-off during wet season periods. This couple of acres has never been planted with cane because of the frequent filling with water, which lies there sometimes for several weeks.

Fig. 76—The digger in operation.

Soon after the purchase of the property in 1914 for use as an Experiment Station the then Director sought to solve the excess water problem by installing an underground drain of six-inch agricultural tile pipes which led under part of the Station and under the full width of an adjoining farm to a natural waterhole near the Sandhills Road. This drain, which had to be installed some five feet below ground level in some sections, and below cultivation depth at all points, served its purpose somewhat inadequately over a long period of years. In recent years, however, the rate of water flow from the Experiment Station basin slowed down considerably and the impounded water caused damage to installations, and inconvenience to workers on the property. Sections of the old drain were dug up and it was found that, over the years, cane roots had entered and practically filled up the six-inch cross section of the agricultural tile pipes.

Fig. 77—The Back-digger opening the trench before the drainage pipes were laid.

Steps were taken to clear out the core of roots by exposing the drain at intervals, taking out a section, and dragging a cleaner through the pipes. But it was appreciated that this was merely a temporary solution of the problem and that the drain would eventually fill with roots again.

Fig. 78—The finished job. Pipes are now cemented and the trench ready for filling.

Accordingly, it was decided to lay a new drain, using nine-inch glazed earthenware pipes with cemented joints, more or less parallel with the older one. The illustrations show some of the operations involved. A Cranwell Back Hoe Digger did the excavation work, the pipes were laid on sand and the joints packed and cemented, and the back-filling was performed with a small blade attached to a tractor.

Many cane growers doubtless have similar depressions on their farms which could be drained more cheaply by excavating an open channel to a lower area. In this case, however, an open drain was impracticable since it would have had to traverse a neighbour's property with inevitable loss of cane land and obstruction to farm working.

—N.J.K.

Fertilizing — A Changing Picture

A change of particular interest to cane growers is the announcement made by Messrs. A.C.F. & Shirleys Fert. Ltd. that the price of straight and mixture fertilizers will be *decreased* as from March 18th. Any substantial reduction in this regard will be more than welcome, since farmers in practically all districts are faced with the necessity of applying adequate amounts of the correct type of fertilizer to their fields.

At the same time it might be pointed out that the plant food requirement of our soils which have been planted to cane for so many years is changing. We cannot assume that a mixture which served us well in the years gone by is the most suitable or the most economical one to apply today. Sugar Bureau Mixtures Nos. 1, 2 and 3 have proved their worth over and over again, but it seems that now is the time to streamline them a little and to give consideration to some alterations in formulae to bring them into line with the changing picture of our soil fertility. Further details of possibilities in this direction will be given in a later issue of this Bulletin.—L.G.V.

Progress in Mechanical Cane Loading

By H. G. KNUST

Shortage of man power since the beginning of 1940 has compelled cane growers in Southern Queensland, and, in recent years, growers in the northern cane growing areas, to adopt mechanical loading of cane to enable them to remove crops within the normal harvesting period.

Makers of one of the early machines, Messrs. Toft Bros., have given much thought to mechanical loading and their latest contribution to this phase of the sugar industry's progress is to produce a one-man hydraulic cane loader. A short description of the machine will indicate the time and

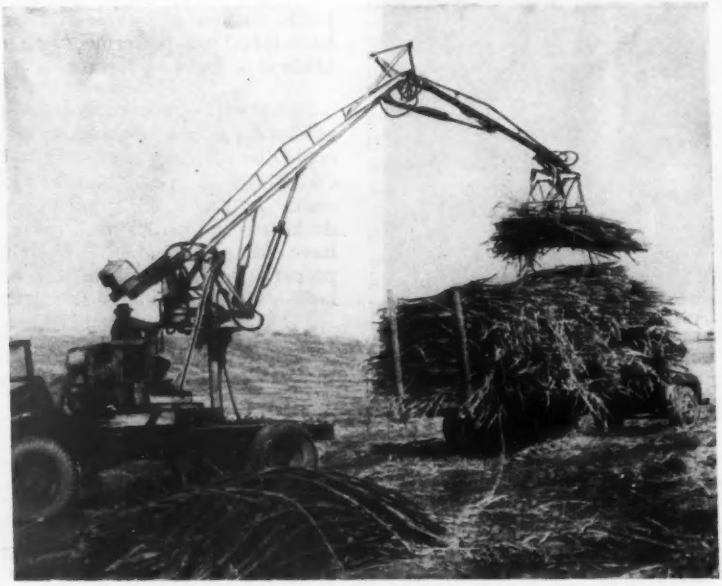


Fig. 79—The operation of loading on to the truck. The operator can be seen at the base of the boom.

The first mechanical loaders introduced were mounted, for mobility, on either a 3-ton self-propelled motor truck chassis or crawler type tractor. Operating power was obtained from an engine, mounted on a platform, power from which was transmitted through drums and clutches operated by multiple levers and pedals to wire ropes which operated the boom and grab. These machines needed at least three units of labour for successful operation.

effort involved in loading cane on to a transport unit.

Loader.

The unit is mounted on a self-propelled 3 ton motor truck chassis and can be readily moved into position behind the cane transport unit (Fig. 79) as required.

Operating Power.

Power for the hydraulic pump is obtained from a 15 h.p. tractor engine.

Boom.

The hinged boom (Fig. 80) is mounted on a column securely fastened to the base platform. Construction is of suitably reinforced tubular steel. The main boom measures about 17 feet in length and the secondary boom about 12 feet.

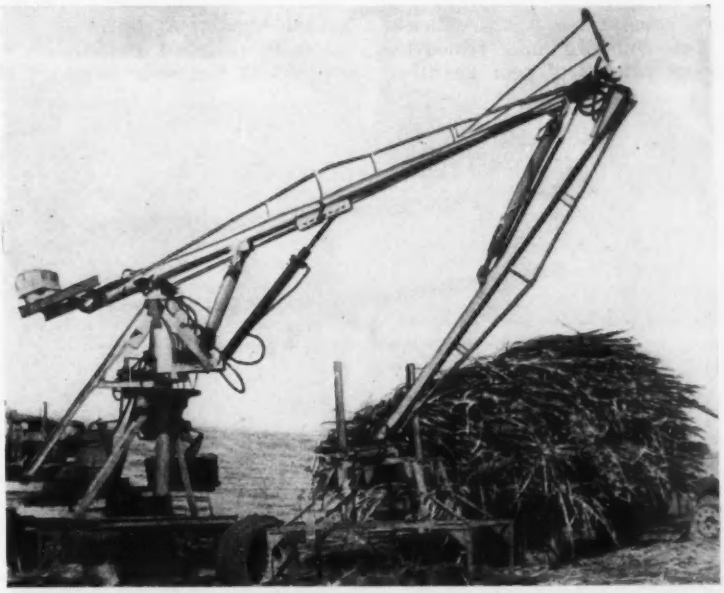


Fig. 80—The hinged boom is so flexible that cane bundles can be picked up immediately alongside the loader.

Grab.

The two-pronged grab has a maximum opening of about 7 feet 6 inches. It is capable of lifting an 8-10 cwt. load, but the makers consider its best working capacity is 5-6 cwt.

Loading Rate.

The loading rate varies according to the weight of crop being harvested. A loading rate of 18 tons per hour is often achieved in a reasonably good crop of cane.

Manipulation.

All hydraulic rams—main boom, secondary boom and grab—and the oil-draulic motor which actuates the full circle turn of the loader, are operated by levers within easy reach of the operator.

The flexibility of this machine is such that it can pick up bundles close to the loader (Fig. 80) and to the extent of its sweep radius, 30 feet. Pick up and release by the grab is clean, and it can pick up cane laid in continuous rows or bundles. The grab can be hydraulically pivoted through 200 degrees.

A Demonstration of Fertilizer Application from the Air

In South Africa and Hawaii the use of an aeroplane to broadcast fertilizer is not unusual. In those countries of large contiguous areas of sugarcane lands, an aeroplane has much to recommend it, being a speedy and efficient means of detecting and remedying developing patches of poor nutrition.

Fig. 81—The aeroplane distributing urea over a field of young cane.

Of course, the greater use would be for overall applications of soluble fertilizers containing nitrogen, potash or phosphate.

Although Queensland sugarcane culture is not yet ready to embrace aerial fertilizing as a practice, it is interesting to record the first demonstration in the Bundaberg area.

Sponsored by Imperial Chemical Industries, a drop was successfully completed during the early morning of 20th December on a block of young ratoons at Fairymead Plantation. Flying at from 25 to 30 feet and at about 75 m.p.h. ground speed, Mr. W. E. Kemp, a pilot with overseas experience in such operations, broadcast urea and, later, sulphate of ammonia in evenly spread 33 feet wide strips. Unfortunately, a cyclonic disturbance moving in from the north caused an unusually strong breeze for the time of day, and there was some drift of material on to headlands.

However, the fact was established that aerial application of fertilizers is on its way, and could become a part of our future sugarcane culture. The prime consideration of cost will be largely determined by the demand for the service.—N.McD.S.

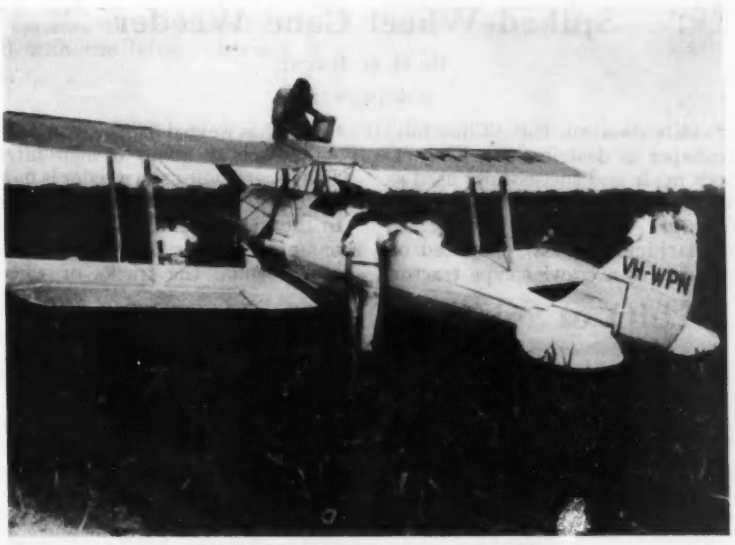


Fig. 82—The 'plane lands in a ratoon field.

Yellow Patches in Young Ratoons

Growers in far northern mill areas acquainted with the spectacular yellowing which so often appears in fields of young ratoon cane, will no doubt be interested to learn of the apparent cause.

During the early spring months of each year as the young ratoon shoots develop, this bright yellowing frequently appears to persist for up to two months, only to disappear of its own accord by a quite rapid change to normal greenness. The complaint may vary in extent from a few affected stools to a full field, and while it is more common on sandy soils and gravelly ridges, it occasionally shows in all soil types. Only seldom does it appear in plant cane, when it is restricted to little more than odd stools. In most cases the effect of the complaint on the ultimate crop does not appear to be unduly detrimental.

The Bureau has been interested in the complaint for some time and last year obtained a response from the application of iron sulphate. This material, as a weak solution, was sprayed on the foliage of the yellow patches and resulted in a rapid return to greenness.

During the coming spring full scale trials will be set out with a view to confirming the foregoing results, and assessing the economics or otherwise of taking corrective action against the complaint.

For the present, while the results obtained are of considerable interest, they do not necessarily suggest that an application of the material to the cane or soil will be justified.—S.O.S.

Spiked-Wheel Cane Weeder

By H. G. KNUST

A modification of the "Churchill" line reshaper as described by King [1] has been made and successfully used as a cane weeder by Messrs. Toft Bros., Bundaberg.

The machine (Fig. 83), mounted on the tool bar of a crawler type tractor, to which is welded 5 inch curved pointed spikes set at about 5 inch intervals. The square tyne cane weeder is mounted on an angle iron frame which is attached to the main frame. Grubber tynes are mounted on the main frame immediately behind the tracks or wheels to

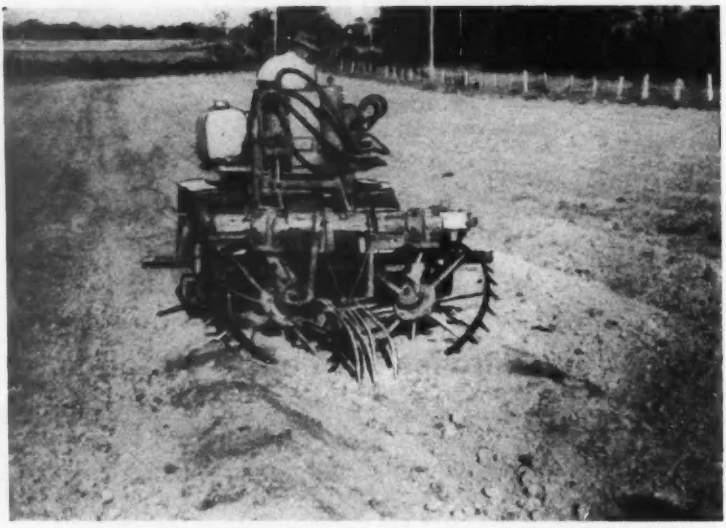


Fig. 83—The spiked-wheel cane weeder weeding cane furrows.

can be adapted for use on any three-point linkage wheel tractor with a rating of 25 h.p. or better. Slotted perpendicular and horizontal turnplates are mounted on the angle iron main frame for row width and wheel setting purposes. The goose neck which is welded to the bottom horizontal turnplate is set at an angle of about 45 degrees and carries the disc casting to which the spoked wheel is attached. The diameter of the wheel is approximately 3 feet. The rim of the wheel is made of 2 inch $\times$ $\frac{3}{8}$ inch mild steel correct soil compaction.

As the tractor moves forward the spikes and the rim of the wheel enter and thoroughly disturb the soil, thereby removing all weeds present. It is essential that the rim of the wheel enters the soil.

The area treated each day with this machine varies in accordance with tractor power and length of row. The unit described above efficiently cultivates from 12-15 acres per day.

As with any other type of weeder this machine does a better job on a

crawler type tractor than on a wheel type because of creep usually experienced with the latter; although it is considered that the wheel type tractor would be suitable for use on level land.

REFERENCE

[1] KING, NORMAN J., 1939. Sugar Cane in Hawaii and the United States. *Cane Growers' Quarterly Bulletin*, April, 1939, p. 151.

Are New Varieties Superior to Old?

During the past twenty-five years all districts in the sugar belt have experienced major changes in their varietal status. In the far north Pindar and Trojan have largely displaced Badila and other old types. In the Lower Burdekin the same has occurred. In Mackay and Proserpine Q.50 reigns supreme, while in the south C.P.29/116, Q.50 and others have replaced P.O.J. 2878, Co.290, M.1900 Seedling and D.1135.

Our sugar industry, in common with sugar industries throughout the world, has become accustomed to a procession of varieties—new ones replacing their predecessors with monotonous regularity. New canes are accepted and grown presumably because they are better yielders, have higher sugar content, are more resistant to disease, and generally improve the economic return to the industry.

All industries have, from time to time, expressed concern at the so-called "running out" of varieties after five or ten years of growth and it has been claimed in some places that all the new "improved" variety accomplishes is to recover what was lost by its predecessor during the "running out" term. Be that as it may our statistics do show a gradual improvement in yield of cane and an enhanced control of diseases.

The discovery of ratoon stunting disease and its effects on crop growth inspired the theory that "running out" or "yield decline", as experienced over the years, was the result of this disease. Since a cure for the disease was at hand and it was possible to develop disease-free stocks of many of the older canes—as well as the newer ones—some interesting varietal trials were laid down so that old and new varieties, in a ratoon-stunting-disease-free state, could be compared. The plant crops of two such trials have been harvested and the results are given in the Varietal Trial section of this Bulletin.

The figures leave no room for doubt that the modern canes are superior to the ones which were grown twenty or more years ago. Both trials were in Bundaberg, where P.O.J.2878 and Co.290 were the major producers of the 1930's. Also included, as representatives of the old brigade, were P.O.J.2725, Q.813, M.189 (Black Innes) and M.1900 Seedling. The trials, one autumn plant and the other spring plant, were grown in a good year which gave every variety the opportunity to do well. The results are overwhelmingly in favour of such modern canes as N.Co.310, Vesta, C.P.29/116, Q.50 and Q.47.—N.J.K.

The Sugar Content of Cyclone Damaged Pindar

By A. G. BARRIE

Introduction:

The strong winds of the cyclone of March, 1956, caused severe damage to the variety Pindar in the northern areas. This damage took the form of a broken top, the break being below the growing point. At the time of the cyclone the brix of the juice was approximately 7.0 in the top half of the stalk (tops) and 12.5 in the bottom half (butts).

On the Northern Sugar Experiment Station one small block of Pindar had about 80 per cent. of the stalks broken. This afforded the opportunity of comparing the brix of broken and sound stalks over the ripening period. Brix measurements, which are a fairly good indication of the sugar content, were made by means of the hand refractometer. Both broken and sound stalks were sampled at intervals of about a fortnight.

The course of the brix in the tops and butts from 9th March to 27th July is shown in Fig. 84. The period can be divided into three sections, viz., 9th March to 24th April; 25th April to 17th May; 18th May to 27th July.

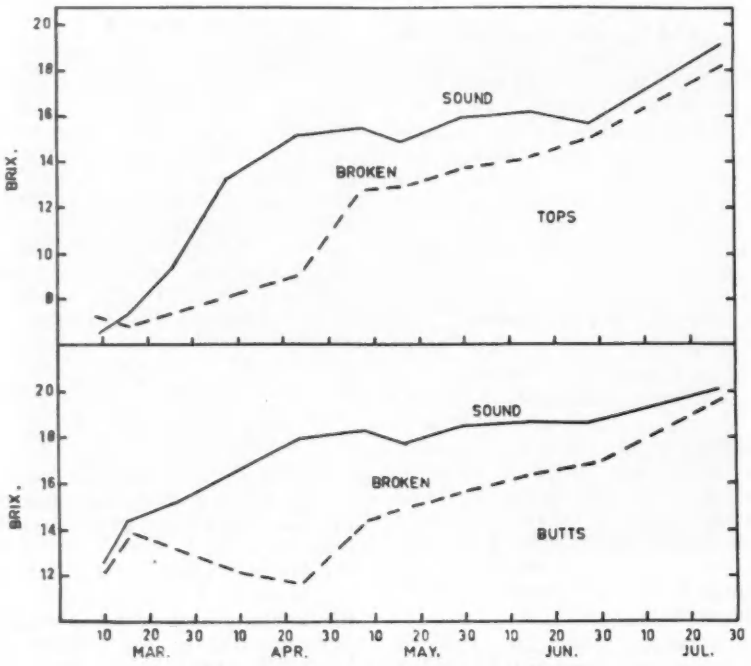


Fig. 84—Brix of sound and cyclone-damaged Pindar.

Section 9th March to 24th April:

During this period there was an increase in the brix of sound stalks from 12 to 18 and from 7 to 16 in the butts and tops respectively. With the broken stalks, however, there was a

decrease of two units in the butts and an increase of the same amount in the tops.

By the second week after the damage had occurred side shoots started to appear and most stalks showed three or four developing. As the shoots were developing sugars were translocated from the butts to the tops although little was used by the developing shoots.

Very little rain fell during this period.

Section 25th April to 17th May:

The main feature of this section was the change in the course of the brix of the butts of the damaged stalks from a decreasing one to an increasing one.

The brix of the tops and butts of the sound stalks remained fairly constant while that of both tops and butts of the broken stalks increased by three and four units respectively.

Approximately five inches of rain fell during this period and with relatively high temperatures the undamaged stalks began to grow again rather than to increase in sugar content. On the other hand, the broken stalks increased considerably in brix and the increase was in both tops and butts.

On 17th May the leaf area of a normal top was compared with that of the three side shoots of a broken stalk. This showed that the side shoots had approximately half the leaf area of the normal top. These new leaves were responsible for the increase in the brix during this period. The sugars produced by the leaves were translocated to the butts for storage.

Section 18th May to 27th July:

During this section both broken and sound stalks showed an increase in brix, but the rate of the rise of the broken ones was slightly greater than that of the sound.

A calculation of the leaf areas of the broken and unbroken stalks showed that they were approximately equal. The side shoots, now quite large, were in some cases showing one or two inches of cane.

A brixing in November of broken and sound stalks on another block indicated that the sugar content was about equal.

Q.57 without Top:

After the cyclone a small amount of Q.57 was topped with a cane knife and brix measurements were done on this and on sound Q.57 to compare its reaction with that of Pindar.

Q.57 produced many more side shoots than did Pindar and in some cases twelve were developing. However, most of these grew only a few inches. It was the top three or four which developed and suppressed the lower ones, most of which eventually died.

With regard to the brix Q.57 showed the same general trend as Pindar. It decreased in brix in both tops and butts, due probably to the development of more side shoots. The recovery was similar to that of Pindar and occurred at the same time; at the end of the period the topped had almost reached the sound cane.

Control of Army Worms

When an army worm outbreak first appears it is difficult to foretell whether it will do sufficient damage to the cane to justify a busy grower taking time off to spray the caterpillars when other work such as harvesting and cultivating is at its peak. However, if it appears that the attack will be severe, the cost of material for spraying is not great and the effort against the pests should prove a profitable undertaking; otherwise the destruction of the cane leaves by the army worms will allow weeds to grow prolifically, which will necessitate costly chipping if the cane is getting too high for mechanical cultivation.

Control can be obtained by the use of one part of 20 per cent. DDT emulsion in 150 parts of water, *i.e.*, just over one ounce per gallon. When measuring out small amounts, as for a knapsack spray, the DDT should not be placed in any measure that might be used for food or medicine, but any tendency to do this can be obviated by using the household measure to calibrate a small tin which could be destroyed after use. Mayonnaise emulsions are viscous and difficult to measure in small amounts, the oil emulsions being preferable, but the mayonnaise is suitable for large tanks on tractor sprays.

In cane three feet high, control has been obtained by the use of 25 gallons of spray per acre, which would cost 10/- to 11/- for DDT. In tackling the outbreak, commence spraying on the margins of the damaged patches to intercept any caterpillars moving from damaged to undamaged cane.—G.W.

Random Gleanings

The Bureau is now planning a new headquarters for its administrative offices and laboratories in Brisbane. Since 1910 the Bureau has occupied portion of the Department of Agriculture and Stock building in Brisbane —moving into a new wing in 1930— but shortage of space in recent years has made it essential that other quarters be sought. The Sugar Experiment Stations Board has now purchased a property fronting on to Gregory Terrace, and it is planned to erect thereon a modern office and laboratory building which will fulfil the Bureau's requirements for a long time to come. The Bureau, in Dr. Maxwell's time as Director (1900-1909), had its headquarters at Bundaberg on the site now occupied by the Lands Office building.

According to Hawaii's "Sugar News" the Hawaiian Sugar Planters' Association spent $1,700,000 (£765,000 Aust.) in 1953 on its research programme. In a recent survey of research by co-operative organizations it was found that, in 1953, 531 co-operative organizations in the United States spent $20,400,000 (£9,184,000 Aust.) and the expenditure of the H.S.P.A. was the greatest. It was further stated that the H.S.P.A. research programme is the oldest of all the organizations surveyed, having started in 1895.

The Hawaiian sugar crop in 1953 was worth approximately $150,000,000 (£67,528,000 Aust.), so that their research expenditure was 1.13 per cent. of gross income.

FREE SERVICES TO CANE GROWERS

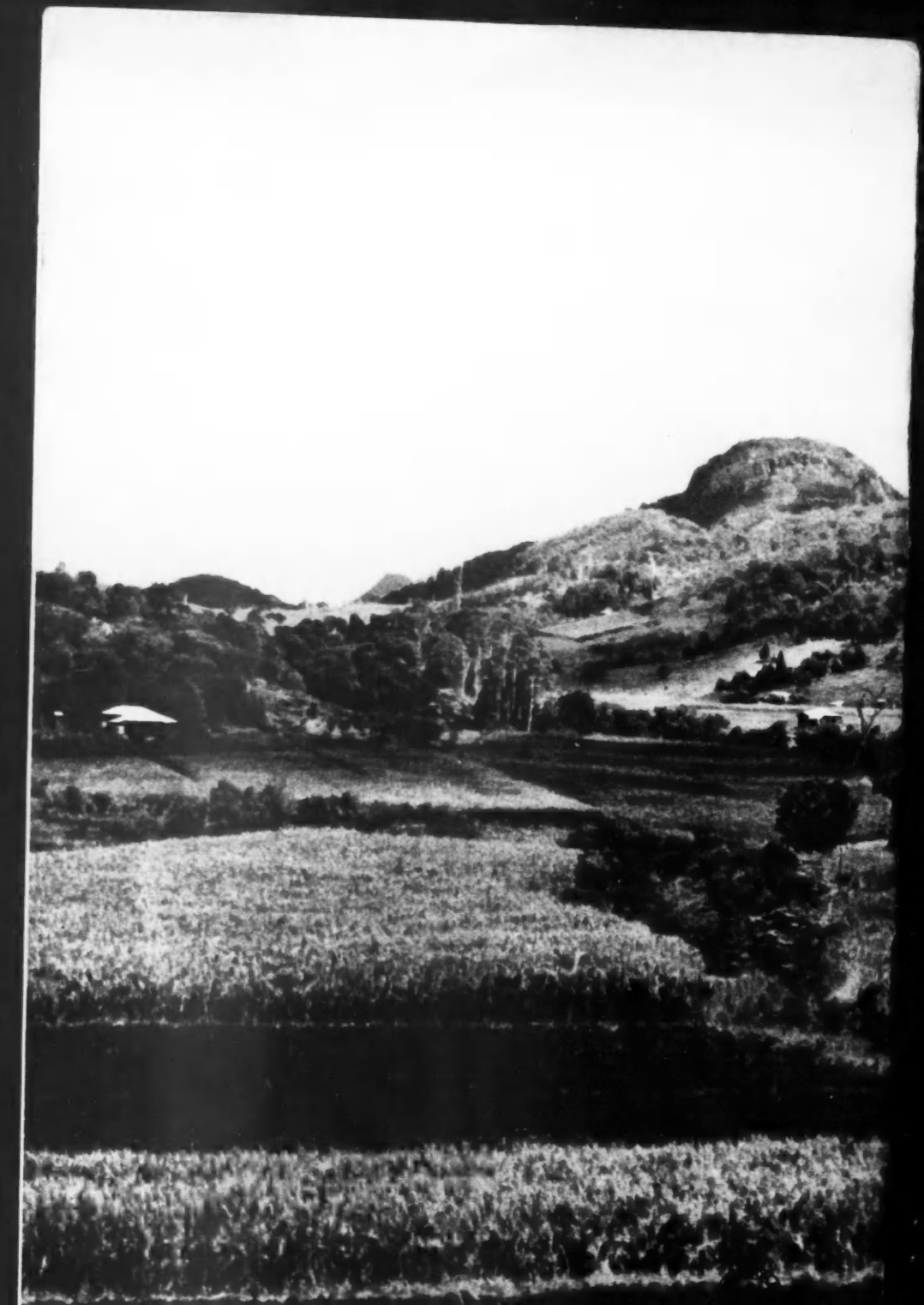
The Bureau offers the following free services to *all* cane growers in Queensland:—

Soil Analysis and Fertilizer Recommendations

Your soil will be analysed by the most modern methods, and a report will be posted containing a recommendation covering the type of fertilizer required, the amount per acre, the need for lime, and other relevant information. Phone the nearest Bureau office and the soil samples will be taken as soon as possible.

Culture for Green Manure Seed

Cultures and instructions for the inoculation of the seed of cowpeas, velvet beans, mung beans or any other legume will be posted to any cane grower upon request to The Director, Bureau of Sugar Experiment Stations, Brisbane. Allow a week after receipt of your letter for the culture to be prepared and posted, but as the culture will easily keep a month or so it is a good idea to get your culture when you get your seed. If sowing is delayed, ask for another batch of culture; there is no charge.

Advice on All Phases of Cane Growing

The Bureau staff is at the service of all cane growers. They can best advise you on matters pertaining to varieties, fertilizers, diseases, pests, drainage and cultural methods. Bureau officers are available in every major cane growing district. A phone call will ensure a visit to your farm.